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*Patent Application Serial No. 10/554,400
Reply to Office Action dated May 12, 2008*

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended): A device (30) ~~[[for]]~~ giving indications to the operator of a work machine which works on a construction surface of a current work object, monitoring at least one reference marker located in the vicinity of the construction surface, characterized in comprising:

an acting component of the work machine that acts directly on the construction surface of the current work object;

a measurement device (20) ~~[[for measuring]]~~ to measure the position of ~~[[a]]~~ the construction surface, ~~which is a~~ of the current work object, the position of the reference marker, and the position of the acting component, ~~other objects located in the vicinity of said construction surface;~~ while said work machine is performing work;

a reference point detection unit (102) ~~[[for detecting]]~~ to detect the reference point ~~[[s]]~~ corresponding to the reference marker ~~[[s]]~~ disposed in the vicinity of said construction surface; ~~from the positions of the construction surface and the other objects measured by said measurement device;~~

a virtual line calculation unit (104) ~~[[for calculating]]~~ to calculate from the reference point a virtual line, passing through the reference point and corresponding to a target construction surface target line that is to be formed by the acting component; ~~on the basis of said reference points detected by said reference point detection unit;~~

a display data creation unit (110) ~~[[for creating]]~~ to create display data ~~for displaying to~~ display images indicating the positions of at least said construction surface and said virtual line,

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on the basis of said positions measured by said measurement device and said virtual line calculated by said virtual line calculation unit; and

a display device (34) ~~[[for receiving]]~~ to receive said display data from said display data creation unit and display ~~[[ing]]~~ said images to the operator on a display screen.

2. (currently amended): The device according to claim 1, characterized in that said display data creation unit (110) creates said display data in such a manner that an image is displayed which also depicts the position of ~~[[said]]~~ other ~~objects~~ reference markers in addition to the positions of said construction surface and said virtual line, ~~is displayed.~~

3. (currently amended): The device according to claim 1, characterized in that said measurement device (20) is disposed in such a manner to move or turn direction in unison with said work machine, when said work machine moves or turns direction, whereby, even if said construction surface moves due to said work machine moving or turning direction, the positions of said construction surface and ~~[[the]]~~ other ~~objects~~ reference markers located in the vicinity of said construction surface are measured and an image indicating the positions of said construction surface and said virtual line is displayed.

4. (currently amended): The device according to claim 1, characterized in that said measurement device (20) determines the positions of said construction surface and other ~~objects~~ reference markers on a continuous basis, whereby ~~an image~~ the images indicating the ~~substantially real-time~~ positions of said construction surface and said virtual line ~~[[is]]~~ are displayed on the display screen substantially in real-time.

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5. (currently amended): The device according to claim 1, characterized in that said reference point detection unit (102) detects a position satisfying prescribed geometrical conditions, from the positions of said construction surface and other ~~objects~~ reference markers measured by said measurement device, as said reference point.

6. (currently amended): The device according to claim 1, characterized in that said reference point detection unit (102) detects a position specified by said operator, from the positions of said construction surface and other ~~objects~~ reference markers measured by said measurement device, as said reference point.

7. (currently amended): The device according to claim 1, characterized in that said reference point detection unit (102) detects a plurality of ~~positions from the positions of said construction surface and the other objects measured by said measurement device,~~ as said reference points including other reference markers measured by said measurement device; and said virtual line calculation device (104) calculates said virtual line in such a manner that said virtual line passes through said plurality of reference points thus detected.

8. (currently amended): The device according to claim 1, characterized in further comprising:

an acting component detection unit (106) for detecting the position of ~~[[an]]~~ the acting component (6) which acts on said construction surface, ~~of said work machine,~~

wherein said display data creation unit (110) creates said display data in such a manner that ~~an image which depicts~~ said images depict the position of said acting component in addition

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to the positions of said construction surface and said virtual line, on the basis of the position of said acting component detected by said acting component detection unit.

9. (currently amended): The construction target indicator device according to claim 8, characterized in that said acting component detection unit (106) detects the position of said acting component from the positions of said construction surface and ~~[[said]]~~ other ~~objects~~ reference markers measured by said measurement device.

10. (currently amended): The device according to claim 9, characterized in further comprising an acting component position correction unit (108) for correcting the position of said acting component detected by said acting component detection unit, by means of a prescribed offset amount;

wherein said display data creation unit (110) creates said display data in such a manner that an image is displayed which depicts the corrected position of said acting component in addition to the positions of said construction surface and said virtual line, on the basis of the position of said acting component corrected by said acting component position correction unit, ~~is displayed.~~

11. (original): The device according to claim 1, characterized in that displacement sensors for measuring the displacement of a plurality of components of said work machine are provided in said work machine; and

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said acting component detection unit (106) detects the position of said acting component on the basis of the displacement of said plurality of components measured by said displacement sensors.

12. (currently amended): The device according to claim 1, characterized in that said display data creation unit (110) creates emphasized display data for displaying an emphasized image which shows an enlarged view of ~~[[the]]~~ positional error between said construction surface and said virtual line, in response to a request from said operator; and

said display device (34) displays said emphasized image by receiving said emphasized display data from said display data creation unit.

13. (canceled)

14. (currently amended): A method for giving indications to the operator of a work machine, characterized in comprising the steps of:

measuring the position of a construction surface, which is a current work object, and the positions of ~~other objects~~ reference markers located in the vicinity of said construction surface, while said work machine is performing work;

detecting reference points corresponding respectively to the reference markers disposed in the vicinity of said construction surface, from the measured positions of the construction surface and the ~~other objects~~ reference markers ;

calculating a virtual line corresponding to a target surface that is to be formed, on the basis of said detected reference points; and

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creating an image indicating the positions of at least said construction surface and said virtual line, on the basis of said measured position and said calculated virtual line,
providing a display screen, and
displaying said image on the display screen.

15. (new): The device according to claim 1, comprising a laser distance measurement device that irradiates a laser beam and continuously changes the angle of elevation of the laser beam at a prescribed cycle to scan the laser beam through a scanning region.

16. (new): The method according to claim 14, comprising providing a laser distance measurement device that irradiates a laser beam and continuously changing the angle of elevation of the laser beam at a prescribed cycle to scan the laser beam through a scanning region.

17 (new): The device according to claim 1, wherein the work machine is an earth-working machine and the work object is earth.

18 (new): The method according to claim 14, wherein the work machine is an earth-working machine and the work object is earth.

19 (new): The device according to claim 1, comprising an input device whereby the operator enters a designated reference point corresponding to a reference marker.